TEXAS AGRICULTURAL EXPERIMENT STATION

BULLETIN NO. 186 MARCH, 1916

DIVISION OF ANIMAL HUSBANDRY

FATTENING LAMBS

POSTOFFICE:
COLLEGE STATION, BRAZOS COUNTY, TEXAS

AUSTIN, TEXAS
VON BOECKMANN-JONES CO., PRINTERS
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BY

J. M. JONES, A. M.,

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*As of March 1, 1916.
**In cooperation with the United States Department of Agriculture.

FATTENING LAMBS.

BY

J. M. JONES, A. M., ANIMAL HUSBANDMAN, BREEDING INVESTIGATIONS.

Lamb feeding is comparatively a new industry in Texas, but the indications are that it will receive extensive development during the next few years. The sheep ranges are bordered by agricultural sections capable of producing a great variety of grain and forage crops suitable for the feeding of lambs. The question of what feeds can be most profitably grown is of vital concern to the prospective sheep feeder. He, of course, desires to grow crops which, when fed to lambs, will produce maximum gains at a minimum cost. Heretofore, the Texas Station has not been in a position to conduct extensive investigations in lamb feeding, because of the fact that no funds have been available for the work.

The test herein reported was conducted in cooperation with Mr. J. E. Boog-Scott, on his farm near Coleman, Texas, who furnished the lambs, feeding stuffs, and the necessary help. In fact, the traveling expenses of the writer were the only expenses borne by the Experiment Station.

OBJECT.

The object of this test was to compare the value of silage, constituting the sole source of a roughage supply in the ration of fattening lambs, with a supply of silage supplemented by cotton seed hulls. Each lot was to receive concentrates in the form of cotton seed meal at the outset, this to be supplemented with milo and feterita chops at such periods as might be deemed advisable. Many feeders do not consider silage as being desirable in the ration of the fattening lamb. Some even contend that it has a deleterious rather than a beneficial effect.

THE EXPERIMENT.

The following was the initial ration supplied to the lambs:

Lot 1.—Cotton seed meal, cotton seed hulls, and silage made from feterita and sorghum.

Lot 2.—Cotton seed meal, and silage made from feterita and sorghum.

During the progress of the experiment the following changes were made in the rations of the two lots: On the 60th day of the test feterita and milo chops were added to the ration of Lot 2; on the 103d day of the test the ration of Lot 1 was supplemented by the same concentrate.

LAMBS USED.

The lambs used in this experiment were raised in Coleman county, under range conditions, by Boog-Scott and Gay, of Coleman. These

lambs were sired by Shropshire rams on Delaine range-bred ewes, and showed a remarkable degree of type and uniformity, all being blocky, compact, and carrying their bodies close to the ground. These lambs were dropped in April, and during the spring and summer they grazed with their mothers on the range, no concentrates in any form being supplied prior to the inception of the test. When the selection was to be made 800 lambs were driven through the chute and 501 of the choice individuals cut from the flock.

The lambs were equally divided insofar as size, quality, and type were concerned. Two hundred and fifty lambs averaging 46.55 pounds were placed in Lot 1, and two hundred and fifty-one averaging 46.92 pounds were placed in Lot 2.

Mr. Boog-Scott purchased the Gay interest in the flock at the rate of $5.75 per hundred pounds live weight, this figure approximating the Fort Worth quotation on the same class of lambs at that time.

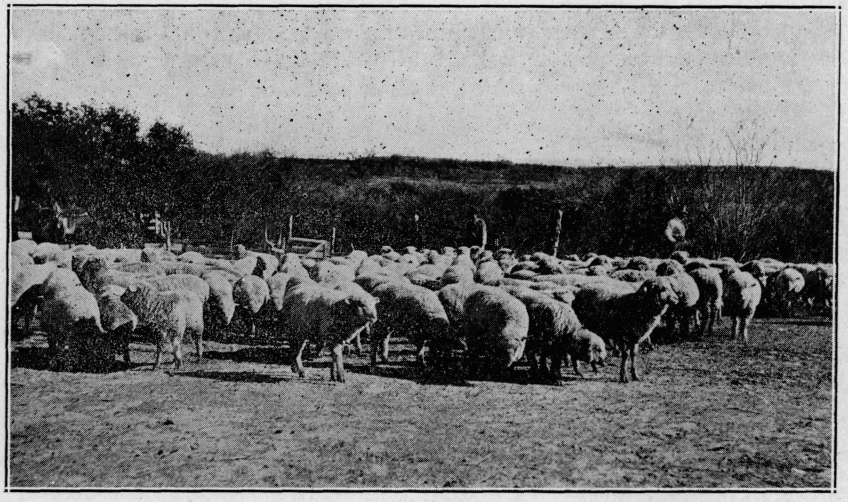

Fig. 1—As the Shropshire-Delaine lambs appeared at the beginning of the experiment.

FEED LOTS AND WATER SUPPLY.

During this test the lambs occupied two adjoining lots that sloped in a direction southernly to the river transversing them. Owing to the southern slope, the lambs received considerable protection from the cold north winds. Another desirable feature of these lots was that during the rainy weather the water readily drained and the lambs were not forced to stand in deep mud. There were eighteen rainy days during the test and the total preciptation as reported by the weather observer at Coleman amounted to 8.49 inches. As no provision had been made to shelter the lambs from the protracted rains, they were forced to remain in the open during all conditions of weather. None of the lambs

had been sheared, and as each carried a very dense fleece they withstood the severe weather conditions in a remarkable manner.

There was a good supply of creek water in addition to that from the well. The water troughs were situated only a short distance from the feed troughs, and during the feeding periods lambs were continually passing to and from the water. Many seemed to prefer the fresh creek water.

Salt was kept constantly before the lambs throughout the entire test. It was carefully weighed out at intervals of several days and placed in small troughs protected from rain by means of a small roof that was placed several inches above the trough.

The lambs of Lot 1 consumed 343 pounds of salt, and those of Lot 2 consumed 308 pounds.

WEIGHTS.

The original plan was to take as the initial weight an average of those weights taken the first three consecutive days of the test; however, this was made impossible on account of the fact that heavy rains set in the night following the first weighing. Accordingly, then, the one weighing had to suffice at the outset. It was planned to weigh the lambs at regular two-week intervals, but on account of the almost incessant rains during the early part of the test, regular weighing could not be done. All weighing was done between the hours of one and two o'clock in the afternoon of the appointed day.

FEED USED.

TABLE I.

COMPOSITION OF THE FEEDS USED DURING THE EXPERIMENT.*

Kind of Feed.	No. Analyses.	Protein—Per cent.	Fat—Per cent.	Crude fiber—Per cent.	Nit. free extract—Per cent.	Water—Per cent.	Ash—Per cent.
Cotton seed meal.....	3	47.92	8.11	7.31	23.97	6.88	5.81
Milo and feterita chops...	2	12.47	2.17	2.84	66.96	13.17	2.39
Sorghum and feterita silage	4	2.25	0.92	8.39	23.09	62.98	2.37
Cotton seed hulls.....	2	4.91	1.16	45.39	36.29	9.74	2.51

The feeds used during this test were of choice quality with the possible exception that the silage next to the silo wall had become badly moulded. Care was taken not to feed any of the mouldy silage to the lambs.

The prices of the feeds used in this test are based on the actual cost at the time the experiment was in progress, plus the cost of delivery to the Boog-Scott farm. The cotton seed meal was figured at $25.00 per ton, cotton seed hulls at $5.50 per ton, sorghum and feterita silage at $3.50 per ton, and milo and feterita chops at $22.00 per ton.

*Analyses by Dr. G. S. Fraps, Chemist, College Station, Texas.

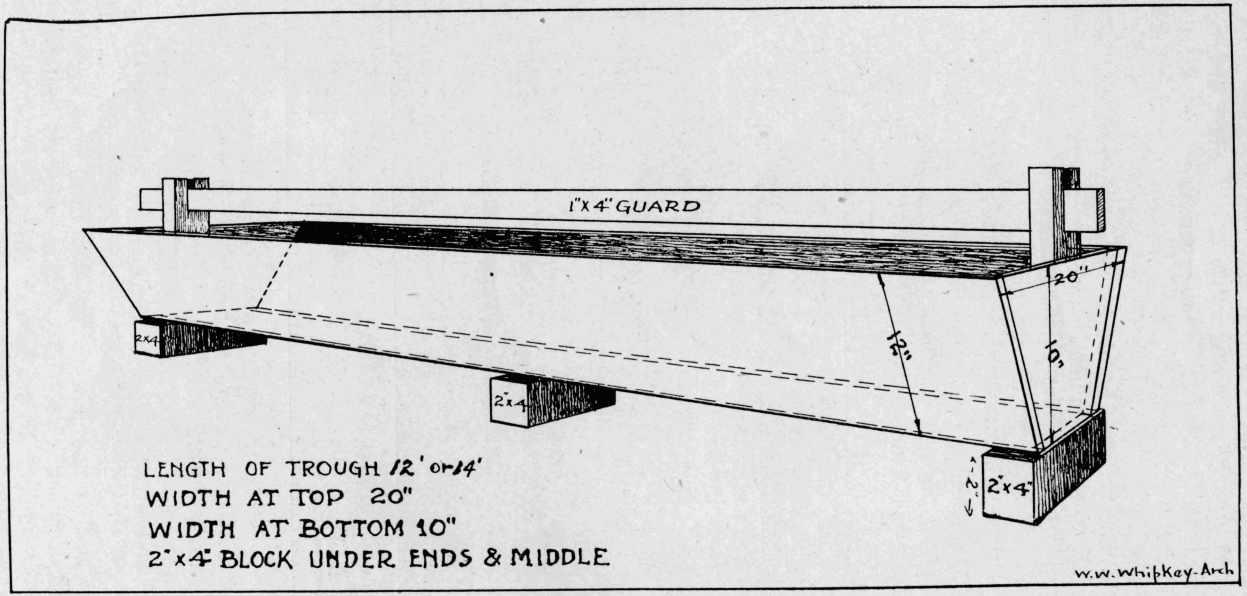

Fig. 2—Feed Trough.

THE METHOD OF FEEDING.

The lambs were fed regularly at 7:00 a. m. and 5:00 p. m. each day. Each feed was weighed separately; then those feeds constituting the ration of the respective lots were mixed and then distributed in the feed troughs, the drawing of a similar trough being illustrated in Figure 2. The lambs were removed from the lots while the feed was being distributed in the troughs. When this method is employed the lambs are not likely to be injured by the wagon and team. Moreover, the distribution of the feed was conducted quickly and with little waste.

SHIPMENTS TO MARKET.

On February 14, 1915, after having been on feed for a period of 83 days, 125 of the best lambs were taken from each lot and sold upon the Forth Worth market. Those remaining in the feed lots were continued on feed until March 22, when they also were shipped to the Fort Worth market.

TABLE II.

SHOWING FEED CONSUMED DAILY PER LAMB DURING EACH OF THE FOUR PERIODS OF THE EXPERIMENT, AND THE AMOUNT OF GAIN, AND COST OF GAIN PER POUND.*

	Lot 1.		Lot 2.	
First Period (59 Days).				
Cotton seed meal	0.236	lb.	0.229	lb.
Cotton seed hulls	0.898	lb.	.....	
Sorghum and feterita silage	2.24	lbs.	3.78	lbs.
Average daily gain	0.349	lb.	0.285	lb.
Cost per pound of gain	$.0267		$.332	
Daily cost of ration	$.0093		$.0095	
Second Period (24 Days).				
Milo and feterita chops	.....		0.89	lb.
Cotton seed meal	0.445	lb.	0.318	lb.
Cotton seed hulls	1.00	lb.	.....	
Sorghum and feterita silage	2.53	lbs.	3.46	lbs.
Average daily gain	0.31	lb.	0.34	lb.
Cost per pound of gain	$.0411		$.0579	
Daily cost of ration	$.0127		$.0198	
Average daily gain for the first two periods	0.338	lb.	0.302	lb.
Cost per pound of gain for the two periods	$.0305		$.0413	
Third Period (19 Days).				
Milo and feterita chops	.....		1.04	lbs.
Cotton seed meal	0.455	lb.	0.37	lb.
Cotton seed hulls	1.017	lbs.	.....	
Sorghum and feterita silage	2.68	lbs.	3.48	lbs.
Average daily gain	0.173	lb.	0.285	lb.
Cost per pound of gain	$.076		$.0777	
Daily cost of ration	$.0132		$.0222	

*After the lambs had been on feed 59 days, the ration of Lot 2 was supplemented by milo and feterita chops. At the end of the second period of 24 days, 125 lambs were "topped" out of each lot and marketed, while at the end of the third period of 19 days milo and feterita chops were supplemented in the ration of Lot 1.

FOURTH PERIOD (17 DAYS).

	Lot 1.		Lot 2.	
Milo and feterita chops	0.736	lb.	1.03	lbs.
Cotton seed meal	0.448	lb.	0.366	lb.
Cotton seed hulls	0.99	lb.	.....	
Sorghum and feterita silage	2.59	lbs.	3.46	lbs.
Average daily gain	0.068	lb.	0.24	lb.
Cost per pound of gain	$.29		$.0909	
Daily cost of ration	$.02		$.022	
Average daily gain for third and fourth periods	0.120	lb.	0.262	lb.
Cost per pound of gain for the last two periods	$.135		$.083	

Table II shows the average daily rations that were supplied during the feeding period. On account of several changes that were made during the progress of the experiment, it became necessary to present the data embodied in this table in four irregular periods, in order that proper comparison might be made.

Fig. 3—Contentment reigns in the feed lot.

The tabulation in the first period shows the average daily ration consumed by Lots 1 and 2 during the fifty-nine-day period. It also shows that the average daily gain per lamb in these lots during the fifty-nine-day period was 0.349 and 0.285 pound, respectively. Although the fact is not shown in the table, it may be of interest to mention that during the first thirty-eight days the lambs were on feed, Lot 1 made an average daily gain of 0.39 pound per head, while those in Lot 2 gained 0.316 pound daily. During the three weeks immediately following the first thirty-eight days of the experiment the daily gains dropped off materially. In Lot 2 the average daily gain dropped to 0.23 pound during the last three days of the first period.

At this point in the experiment it was evident that it would not be well to allow the lambs constituting Lot 2 to remain on the sole ration of cotton seed meal and silage for a longer time, as it was with difficulty that they were kept "on feed." In an effort to overcome this

condition milo and feterita chops were added to the ration, and during the first six days following the introduction of this feed the average daily gain increased from 0.23 to 0.42 pound per head, the latter being a gain almost double that made daily during the week previous to the introduction of the chops.

It will be noted from Table II that during the first fifty-nine days of the feeding period the daily cost of the ration supplied to the lambs in each lot was less than one cent per head. Also that during this period the cost of one hundred pounds of gain was $2.67 for Lot 1 and $3.32 for Lot 2.

The cost of gains in each lot was considerably enhanced during the second period, as shown by Table II. During this period the lambs in each lot made material gain. Lot 1 averaging 0.31 pound and Lot 2 0.34 pound per head daily. The cost of one hundred pounds gain during this period increased from $2.67 to $4.11 in Lot 1, and from $3.32 to $5.79 in Lot 2.

At the end of the second period of twenty-four days one hundred and twenty-five fat lambs were "topped" from each lot and sent to the Fort Worth market; those from Lot 1 sold at $7.60 per hundred pounds, while the Lot 2 lambs, which showed a little more finish, brought $7.80.

The shrinkage on the first shipment of lambs was high. At the feed lots the one hundred and twenty-five pound lambs "topped" from Lot 1 averaged 78.7 pounds, while those of Lot 2, although carrying more finish, averaged only 75.4 pounds. On the Fort Worth market the next day the Lot 1 lambs averaged 68.2 pounds, while those from Lot 2 averaged 66.5 pounds, i. e., the lambs of Lot 1 shrank 13.4 per cent. and those of Lot 2, 11.2 per cent.

In Table II the third period shows the average daily ration received by the lambs remaining in the feed lots after the fat lambs had been "topped" out. During this nineteen-day period the rations supplied to Lots 1 and 2 were practically the same as they had been receiving during the twenty-four days previous to the first shipment of lambs to market. The average daily gain made by the lambs remaining in Lot 1 during this period was 0.173 pound, while those of Lot 2 averaged 0.285 pound per head daily during the same period. The average daily cost of the ration per lamb in Lot 1 during the third period was $.0132, while that of Lot 2 averaged $.0222 per head.

Even though the raily ration of the lambs in Lot 2 cost almost twice that consumed by Lot 1, the average daily gain of Lot 2 was almost twice that made by Lot 1 during this period. It will be noted that even though Lot 2 received a ration twice as costly as that supplied to Lot 1 during this period, nevertheless, it proved to be an economical ration during this period on account of the increased gain made over that of the Lot 1 lambs. During the third period the cost per hundred pounds of gain was $7.60 for Lot 1 and $7.77 for Lot 2.

By referring to Table II it will be noted that during the third period the average daily gain of the Lot 1 lambs was only 0.173 pound, and in an effort to increase the gain milo and feterita chops were added to the ration on the twentieth day after the disposal of the first ship-

ment. Since the lambs of Lot 2 made a considerably enhanced daily gain after the introduction of milo and feterita chops, it was believed that the same would hold true in the case of Lot 1. This, however, did not prove to be the case, as will be revealed by referring to the fourth period under Table II. During a period of seventeen days the Lot 1 lambs received an average daily allowance of 0.736 pound of milo and feterita chops in addition to the regular ration that had been supplied throughout the test. For some reason the average daily gain during this period figured only 0.068 pound per head, while during the same time the Lot 2 lambs averaged a daily gain of 0.24 pound, and seemed to have rounded into good shape. The lambs in Lot 1 remained "on feed" throughout the entire test, and after the addition of the milo and feterita chops their appetites remained normal, but for some reason they derived no benefit from the addition of the grain. During the fourth period the cost per hundred pounds of gain for Lot 1 was $29.00 and $9.09 for Lot 2.

After the Lot 1 lambs had been fed milo and feterita chops for a period of seventeen days it was clearly evident that further gains would not be made. The Lot 2 lambs had put on a fair finish by this time; so both lots were weighed, the Lot 1 lambs averaging 75 pounds and those of Lot 2, 78 pounds. On the Fort Worth market the next day the Lot 1 lambs averaged 66 pounds, while those of Lot 2 averaged 69 pounds, i. e., the lambs of each lot shrank 12.1 per cent. The lambs sold on a brisk market, the Lot 1 lambs going for $8.40 per hundred pounds, while the Lot 2 lambs, which again showed more finish, brought $8.60.

DISCUSSION.

Not a single loss occurred in Lot 1 during the entire test, while in Lot 2 six deaths were recorded. Of this number only two seemed to be affected with a derangement of the digestive tract. This condition was probably brought about by an insufficient amount of dry matter in the ration. The other losses are accounted for as follows: One lamb that had gone blind previously to the starting of the feeding period was brought to the feed lots and the seriousness of his condition remained unnoticed until after the lambs had been on feed a few days. This lamb was removed and fed alfalfa hay in addition to grain ration but the little fellow died within a few days. One lamb was drowned in the creek; one got on his back in a feed trough; and only a few days prior to shipment one of the healthiest and hardiest of the lambs died very suddenly from what appeared to be apoplexy.

The lambs of Lot 1 must have become "burned out" after having been on a ration of cotton seed meal, cotton seed hulls and silage for a period of one hundred days, because after the addition of the milo and feterita chops the average daily gain was not enhanced. It will be observed by comparing the gains made by Lot 2 during the first and second periods that the average daily gain was somewhat enhanced after the addition of milo and feterita chops. Since this increased gain was made by Lot 2, after the addition of grain, it seems that the same

would be true of Lot 1 had the digestive organs of these lambs been in shape properly to digest the food.

There are a number of sheepmen who are rather skeptical regarding the feeding of silage to sheep. The test herein reported seems to prove that when fed in moderate amounts, to fattening lambs, the results are satisfactory in every way. The test did indicate that on account of the high degree of moisture contained in the silage some form of dry roughage should be added to the ration of fattening lambs that are receiving this feed. As shown by this test, the Lot 1 lambs consumed an average of about 2.6 pounds of silage daily in addition to an allowance of one pound of cotton seed hulls per head. The Lot 2 lambs consumed about three and one-half pounds of silage daily, but received no dry roughage. The lambs in the lot receiving the cotton seed hulls made a larger gain than that made by Lot 2 during the first period of fifty-nine days when supplied with a ration consisting of cotton seed meal and silage.

Fig. 4—The same lambs ready for market.

After milo and feterita chops had been added to the ration of Lot 2, as indicated by Table II, the lambs made a greater daily gain than did Lot 1 throughout the remainder of the test. Even though the average daily gain made by Lot 2 was considerably enhanced after the milo and feterita chops were supplemented in the ration there was still evidence of a deficiency in the amount of the dry matter, and it would no doubt be well for those contemplating the feeding of lambs to provide some form of dry roughage in addition to the silage.

There is more truth than poetry in the old adage that "The eye of the master fattens his flock." Several weeks prior to the inception of the experiment herein reported a deck of lambs had been "topped" from the Boog-Scott and Gay flock, by Mr. W— and placed on a daily ration consisting of one-half pound each of cotton seed meal and milo

and feterita chops, in addition to all the silage made from milo and feterita that the lambs would consume. After the lambs had been on feed for a period of fifty days, the cotton seed meal and milo and feterita chops were each increased to one pound per head. It is interesting to note that the lambs purchased by Mr. W— averaged ten pounds heavier at the outset than did those reported in this test. The lambs owned by Mr. W— were on feed for a longer period of time than were the experimental lambs, and at the time of marketing averaged approximately the same as the lambs reported in this test. It is interesting to observe that the lambs belonging to Mr. W—, from the outset, received one-half pound cotton seed meal daily per lamb, while at no time during the progress of the test herein reported did the experimental lambs receive more than 0.48 pound cotton seed meal per head daily. It is obvious that by the practice of such wasteful methods in feeding that Mr. W— lost money on his bunch of lambs, while the Boog-Scott lambs netted a neat profit.

In the fattening of lambs the success of the undertaking depends largely upon the ability of the feeder. Every feeder should have some knowledge of live stock and should be well enough informed upon the subject of feeding to know whether or not the lambs are remaining "on feed" and continuing to make good gains. In reference to Mr. W—'s lambs, it is here appropriate to state that Mr. W— had a good supply of the proper kinds of feed but the difficulty in his case was that he had in his employ a man who was not at all familiar with live stock, knew nothing about the feeding of animals, and was unable to determine whether the lambs were increasing or declining in weight.

In fattening lambs the amateur feeder is cautioned to avoid shipping half-fat lambs to market, as such a practice shows inconsistency on his part as a feeder, and in instances where large numbers are fed the loss is likely to be large.

TABLE III.

SUMMARY OF EXPERIMENT.

	Lot 1 250 lambs	Lot 2 251 lambs
Purchase value of lambs per hundred pounds	$ 5.75	$ 5.75
Initial weight of lambs (pounds)	11,638	11,778
Gain during first 83 days	7,014	6,198
Gain during last 36 days	559	1,155.8
Total gain made by lambs	7,573	7,353.8
FEED CONSUMED, FIRST AND SECOND PERIODS.		
Cotton seed meal (pounds)	6,156	5,235
Silage	48,254	75,768
Cotton seed hulls	19,260	.....
Milo and feterita chops	.....	5,278
FEED CONSUMED, THIRD AND FOURTH PERIODS.		
Cotton seed meal (pounds)	2,034	1,606
Silage	11,891	15,135
Cotton seed hulls	4,526	.....
Milo and feterita chops	1,566	4,526

COST OF FEED, FIRST AND SECOND PERIODS.

	Lot 1 250 lambs	Lot 2 251 lambs
Cotton seed meal	$ 76.95	$ 65.44
Silage	84.44	132.59
Cotton seed hulls	52.96	.....
Milo and feterita chops	.....	58.05

COST OF FEED, THIRD AND FOURTH PERIODS.

Cotton seed meal	$ 25.43	$ 20.07
Silage	20.81	26.49
Cotton seed hulls	12.45	.....
Milo and feterita chops	17.22	49.79

WEIGHT RECORD.

Weight of first shipment at feed lots day shipped (pounds)	9,844	9,368
Weight of first shipment after arrival Fort Worth (pounds)	8,520	8,320
Shrinkage (per cent.)	13.4	11.2
Weight of second shipment at feed lots day shipped (pounds)	9,367	9,366
Weight of second shipment after arrival Fort Worth (pounds)	8,230	8,230
Shrinkage (per cent.)	12.1	12.1

FINANCIAL STATEMENT.

Initial cost of lambs	$ 669.18	$ 677.24
Cost of feed	290.25	352.43
Labor in feeding lambs (estimated)	40.00	40.00
Interest on purchase price of lambs, 90 days, at 8 per cent.	13.38	13.54
Freight Coleman-Fort Worth (double-deck car)	44.00	44.00
Selling commission	12.00	12.00
Yardage (5 cents per head)	12.50	12.25
Sales receipts first shipment Lot 1, 125 lambs, 8520 pounds, at $7.60	$ 647.52	
Sales receipts first shipment Lot 2, 125 lambs, 8320 pounds, at $7.80		$ 648.96
Sales receipts second shipment Lot 1, 125 lambs, 8230 pounds, at $8.40	691.32	
Sales receipts second shipment Lot 2, 120 lambs, 8230 pounds, at $8.60		707.78
Total sales receipts	$1,338.84	$1,356.74
Less initial cost of animals, feed, labor, interest, and shipping expenses	1,081.31	1,151.46
Profit per lot	$ 257.53	$ 205.28
Profit per lamb	1.03	.82*
Per cent. profit on investment	38.4	30.3

A summary of this experiment, as presented in Table III, shows that the feeding test herein reported proved to be profitable. The two hundred and fifty lambs in Lot 1 that were placed on feed at the inception of the experiment were all marketed,—not a single loss occurred during the

*Average profit per head an original number placed in Lot 2.

entire period. The lambs of Lot 1 returned a profit of $257.53 above all expenses. Each lamb in Lot 1 returned a profit of $1.03. There were two hundred and fifty-one lambs in Lot 2 at the beginning of the experiment but during the test six died. This loss alone slightly reduced the profit returned by Lot 2. The total net profit returned by Lot 2 amounted to $205.28. If one figures the return on the basis of the original two hundred and fifty-one lambs placed on feed, the average profit per lamb amounted to 82 cents. Throughout the experiment the average cost of producing one hundred pounds of gain was $3.83 for Lot 1 and $4.79 for Lot 2.

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SUMMARY.

1. Good silage can be fed to fattening lambs without injury to them. As shown under Table II, in the first period, the lambs in Lot 2 consumed an average of 3.78 pounds of silage per head daily. During this period cotton seed meal and silage formed the ration and the average daily gain was 0.285 pound per head.

2. While silage seems to have a place in the ration of a fattening sheep, it should not constitute the only roughage. Owing to the succulent nature of silage, it is quite impossible for lambs to consume enough of this feed to get the necessary amount of dry matter that is required by the animal body.

3. Lambs receiving silage as the sole roughage are inclined to go "off feed."

4. The lambs in Lot 1 received cotton seed hulls in addition to the silage, and throughout the entire feeding period all lambs remained continually "on feed."

5. No mouldy silage was fed to the lambs and no losses directly attributed to the feeding of inferior silage resulted.

6. The lambs in Lot 1 made a good economical gain during the early part of the feeding period, but on the ration supplied did not finish well.

7. After the lambs had been on a ration of cotton seed meal, cotton seed hulls and silage for one hundred days, they apparently became "burned out," because after ground feterita and milo had been added to the ration on the 103d day of the feeding test, the average

daily gain per head during the final seventeen days of the test was only 0.068 pound.

8. During the first six days after the feterita and milo had been supplied in the ration of Lot 2 at the end of the first fifty-nine-day period, the average gain per head was increased from 0.24 to 0.42 pound daily.

9. After ground feterita and milo had been supplemented in the ration received by Lot 2, the lambs did not go "off feed" as readily as when on the ration composed wholly of cotton seed meal and silage.

10. The lambs of Lot 1 returned a profit of $1.03 per head, or a profit of 38.3 per cent. on the original investment.

11. The lambs of Lot 2 returned a profit of 82 cents per head, or a profit of 30.3 per cent. on the original investment.

12. Throughout the experiment the cost of salt per head figured less than one cent.